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Time Evolution of the Magnetic Field Topology of Cylindrical Wire Array Z-Pinches MATTHEW MARTIN, JOHN GREENLY, CHARLES SEYLER, Laboratory of Plasma Studies, Cornell University — We study the influence of the magnetic field topology and the global field penetration time on the ablation plasma dynamics of individual wires in wire array Z-pinches. Knowledge of the magnetic field configuration is necessary for understanding the ablation plasma acceleration process near the wires and the validity of constant ablation velocity approximation as applied to the 1 MA COBRA pulsed power generator. Three-dimensional resistive MHD simulation results suggest that a change in the global magnetic field topology is critical to initiating inward flow of the ablation plasmas. These simulation results are investigated experimentally by using B-dot probes to track the evolution of the field topology over time for small wire number cylindrical arrays on COBRA. This research was supported by the Stewardship Sciences Academic Alliances program of the National Nuclear Security Administration under DOE Cooperative agreement DE-FC03-02NA00057.

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